

## Glossary of terms and concepts

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# Glossary of terms and concepts

## Drought and water scarcity

### Drought: Concept

Drought is a recurrent feature of climate that is characterized by temporary water shortages relative to normal supply, over an extended period of time –a season, a year, or several years–. The term is relative, since droughts differ in extent, duration, and intensity.

### Drought: Typologies

Operational definitions define the onset, severity and the end of a drought and refer to the sector, system, or social group impacted by drought. In all cases, drought impacts occur when water supply systems cannot satisfy the needs and demands that are met under normal conditions. The main operational definitions are meteorological, hydrological, and agricultural drought.

**Meteorological.** Meteorological drought specifies the degree of deficient precipitation from the threshold indicating normal conditions (e.g. average) over a period of time, and the duration of the period with decreased precipitation. Definitions of meteorological drought are region specific since the atmospheric conditions that result in deficiencies of precipitation are highly variable from region to region. In addition to lower than normal precipitation, meteorological drought may also imply higher temperatures, high speed winds, low relative humidity, increased evapotranspiration, less cloud cover and greater sunshine resulting in reduced infiltration, less runoff, reduced deep percolation and reduced groundwater recharge. In many cases the primary indicator of water availability is precipitation.

**Agricultural.** Agricultural drought for rainfed agriculture: deficit in soil moisture following a meteorological drought that produces negative impacts on crop production and/or natural vegetation growth. Agricultural drought for irrigated agriculture: water shortage in irrigation districts due to drought in surface or groundwater resources supplying agricultural use.

**Hydrological.** Hydrological drought is concerned with the consequences of rainfall deficiency in the hydrologic system. It refers to the decline in surface and subsurface water supply. Hydrological droughts are usually out of phase with or lag behind the occurrence of meteorological and agricultural droughts (see above) because it takes longer for precipitation deficiencies to show up in components of the hydrological system. It can be measured as a threshold level of stream flow, lake, and groundwater levels.

## Water Shortage

Water shortage refers to the relative shortage of water in a water supply system that may lead to restrictions on consumption. Shortage is the extent to which demand exceeds the available resources and can be caused either by drought or by human actions such as population growth, water misuse and inequitable access to water. At the national level water shortage is expressed as m<sup>3</sup> per capita per year. The greater the figure the greater is the shortage. Most of the Mediterranean countries are facing water shortages.

## Scarcity

Scarcity refers to a permanent situation of shortage with reference to the water demands in a water supply system or in a large region, characterized by an arid climate and/or a fast growth of water consumptive demands.

## Hydrological Drought and Land Use

It is defined as the land use change effect on the hydrological cycle. Land use changes may cause water shortage even when no change in precipitation occurs.

### Aridity

Permanent climatic condition with very low annual or seasonal precipitation.

## Weather and climate

### Weather

Weather is the state of the atmosphere for a brief period of time in a particular geographical place.

### Climate

Climate represents the normal or average state of the atmosphere for a given time of year and a given location.

## Water supply and demand

### Natural water resources

The total water resources that flow in fixed rivers and or aquifers for a time interval (generally a year) as average amount or value of a defined probability.

### Water Supply

Supply is the aggregate of all water resources that are likely to be used. It includes precipitation, natural resources including groundwater, and non-conventional sources. For a hydrological system, supply takes into account the distribution system, the dimensions and capacity of the infrastructures, the usage rights, and other conditioning factors that should be taken into account.

### Water supply system

Facilities for derivation and storage, conveyance, distribution of water and demand centres of use as municipalities, irrigation district, etc.

### Available water resources

Available resources are usually the fraction of natural water resources that can be supplied where and when they are required. They are affected by hydrographic, geological, geographical and /or technological constraints (e.g. capacity of abstraction, storage and transport of water), socio-economic considerations, and they have complex institutional implications. They can change in time due to change in natural availability, new ecological constraints and new technological tools.

### Renewable water resources

Renewable water resources are the long term average of freshwater volume supplied naturally by the hydrological cycle, derived from the total runoff (surface and underground). Renewable water

resources generally refer to the river basin unit. When the geographic unit is different from the basin unit, it is necessary to differentiate between internal resources over the territory, and external or trans-boundary resources outside the territory.

## Guarantee of water supply

Guarantee of water supply is the acceptable level of water supply required for a particular supply system. In most countries and systems this value is defined by administrative normatives or recommended by voluntary standards.

## Water consumption

Water consumption is the portion of the withdrawals (water supplied) that is not returned to the environment after use, it is either consumed by activities or discharged into the sea or evaporated.

## Water demand

Water demand is the actual need for water under current water use practices (i.e. irrigation techniques, efficiency of the system, water pricing policies, present cultural practices, standard of living, etc.). It is determined by the needs of users' activities.

## Consumptive demand

Demand of water that is not returned to the environment after use, being either consumed by the activities or discharged to the sea or evaporated. It includes part of urban demand, irrigation, and industrial water demands.

## Non-consumptive demand

Demand for water that is returned to the environment without significant alteration to its quality. It includes hydroelectric generation, cooling systems, aquaculture, domestic effluents, irrigation return and environmental flows. Non-consumptive water demand strongly conditions and limits the supply of the consumptive uses, because it needs to be available –in time and space– and with the appropriate quality.

## Environmental demand

Environmental demand is the water necessary –in quantity and quality– to support the ecological functioning of ecosystems including their processes and biodiversity. Under some legal frameworks, in-streamflow requirements may impose constraints on other off-stream demands.

## Future water demand

Future demand of water based upon future scenarios of water management policies, and influenced by demographic, socio-economic and cultural changes.

## Water efficiency

Water efficiency is the percentage of water that is actually used out of the total abstracted volume.

## Hydrological systems

Some general terms referring to hydrologic system and water resources extracted from the EC Framework Directive 2000/60.

### Hydrographic district

The area of land and sea, made up of one or more neighbouring river basins together with their associated groundwater and coastal water, which is identified under Article 3(1) as the main unit for management of river basins.

### Hydrographic basin

The area of land from which all surface run-off flows through a sequence of streams, rivers and, possibly, lakes into the sea at a single river mouth, estuary or delta.

### Sub-basin

The area of land from which all surface run-off flows through a series of streams, rivers and, possibly, lakes to a particular point in a water course (normally a lake or a river confluence).

### Body of surface water

A discrete and significant element of surface water such as a lake, a reservoir, a stream, river or canal, part of a stream, river or canal, a transitional water or a stretch of coastal water.

### Aquifer

A subsurface layer or layers of rock or other geological strata of sufficient porosity and permeability to allow either a significant flow of groundwater or the abstraction of significant quantities of groundwater.

### Body of groundwater

A distinct volume of groundwater within an aquifer or aquifers.

### Water services

All services which provide, for households, public institutions or any economic activity:

- (a) abstraction, impoundment, storage, treatment and distribution of surface water or groundwater,
- (b) waste-water collection and treatment facilities which subsequently discharge into surface water.

### Catchment or basin

Catchment or basin is the area of land drained by a river and its tributaries.

### Runoff

Runoff is the portion of rainfall that is not immediately absorbed into the soil and which becomes surface flow.

## Flow or discharge

Flow is the amount of water that passes a specified point in a hydraulic system (i.e. river).

## Base flow

Base flow is the flow in rivers and streams that occurs in dry weather and usually from groundwater inflows.

## Flow regime

Flow regime is the pattern of water flow in a river or stream. In undeveloped rivers and streams flow regimes are related to climatic conditions. In regulated rivers (i.e. dammed rivers), flow regimes are often altered from natural patterns.

## Groundwater

Groundwater is the water that occurs beneath the ground held in or moving through saturated layers of soil, sediment or rock.

## Recharge

Recharge is the portion of rainfall or river flow that percolates down through the soil and rock formations to reach the groundwater.

## **Risk, impacts, vulnerability and preparedness**

### Vulnerability

A set of conditions and processes resulting from physical, social, economic, and environmental factors, which increase the susceptibility of a community to the impact of hazards.

### Vulnerability Assessment

This provides the framework for identifying or predicting the underlying causes of drought related impacts. In many cases drought may only be one factor along with other adverse social, economic and environmental conditions that create vulnerability.

### Hazard

A potentially damaging physical event, phenomenon and/or human activity, which may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation. Each hazard is characterized by its location, intensity, frequency and probability.

### Risk

The probability of harmful consequences, or expected losses (deaths, injuries, property, livelihoods, economic activity disrupted or environment damaged) resulting from interactions between natural or human-induced hazards and vulnerable conditions.

## Risk Analysis

A process to determine the nature and extent of risk by analysing potential hazards and evaluating existing conditions of vulnerability that could pose a potential threat or harm to people, property, livelihoods and the environment on which they depend.

## Uncertainty

Uncertainty is the situation when the probability of occurrence and potential impacts of a damaging phenomenon are not known.

## Disaster

A serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources.

## Capacity to face with risk

Capacity is a combination of all the strengths and resources available within a community or organization that can reduce the level of risk, or the effects of a disaster.

## Preparedness

Preparedness is the reduction of risk and uncertainty. Preparedness therefore refers to the activities and measures taken in advance to ensure effective response to a potential impact of hazards.

## Prevention

Prevention is the reduction of risk and the effects of uncertainty. Prevention therefore refers to the activities that provide outright avoidance of the adverse impacts of hazards.

## Mitigation

Mitigation is the set of structural and non-structural measures undertaken to limit the adverse impact of hazards.

## Strategic reserves

Strategic reserves are those of restricted access, only to be made use of for the resolution of shortage or drought scenarios or for the prevention of similar situations in the near future.

## Forecast

Forecast is the statistical estimate or the definite statement of the occurrence of a future event.

## Early warning

Early warning is the provision of timely and effective information, through identified institutions, that allows individuals at risk of a disaster, to take action to avoid or reduce their risk and prepare for effective response.

## Crisis management

Crisis management is the unplanned reactive approach that implies tactical measures to be implemented in order to meet problems after a disaster has started.

## Proactive management

Proactive management are the strategic measures, actions planned in advance, which involve modification of infrastructures, and / or existing laws and institutional agreements.

## Drought Impact

A specific effect of drought on the economy, on the social life or on the environment, which is a symptom of vulnerability.

## Drought Impact Assessment

This is the process of assessing the magnitude and distribution of the effects due to drought.

## **Organizations, institutions, networks, and stakeholders**

### Organizations

A group of persons formally joined together for some common interest.

### Institutions

A public organization with a particular purpose or function in relation to law, policy, and administration and that establishes rules for its operation.

### Networks

Network is a group that interacts or engages in informal communication for mutual assistance or support.

### Stakeholders

Stakeholders are those actors who are directly or indirectly affected by an issue and who could affect the outcome of a decision-making process regarding that issue or are affected by it.

In MEDROPLAN, stakeholders can be individuals, organizations, institutions, decision-makers, or policy-makers, who determine or are affected by water use and exposure to drought and water scarcity.

On the one hand, stakeholders enact institutions –sets of rules, norms, shared strategies– and, on the other hand, they are constrained by them in their responses to drought preparedness and management. Therefore a purposeful description of the map of legitimate actors, as well as an analysis of their interests, values and approaches to risk is a pre-requisite for the understanding of their link with institutional drought policy.

## **Data, indicators and indices**

### **Data**

Individual measurements; facts, figures, pieces of information, statistics, either historical or derived by calculation, experimentation, surveys, etc.; evidence from which conclusions can be inferred.

### **Proxy data**

Data used to study a situation, phenomenon or condition for which no direct information such as instrumental measurements is available.

### **Indicator**

Observed value representative of a phenomenon to be studied (social, economic or environmental). In general, indicators quantify information by aggregating different and multiple data. The resulting information (about complex phenomena) is therefore synthesized and simplified.

### **Index**

A weighted combination of two or more indicators. An index is designed to be a summary of a system. For example, an “environmental index” may include data about air quality, water quality, soil quality, etc. Another example are economic indicators which are used to forecast economic activity, such as GDP growth rate. An index can be used to lead to a particular fact or conclusion.

### **Correlation**

The extent to which two variables vary together (either in a positive or negative relationship). A positive correlation exists when one variable increases as the other increases. A negative correlation exists when one variable decreases as the other increases. A fundamental principle of statistics is that correlation does not necessarily imply causation. This is easy to forget in the quest to understand relationships between different indicators. In the case of drought for example, a positive correlation may exist between deteriorated water quality and a drought index, but the deteriorated water quality does not cause drought.

### **Accuracy**

Refers to how well the measurement of an object or phenomenon reflects its actual state.

### **Precision**

The fineness of the measurement. Values from an instrument that measures parts per million are more precise than values from one which measures in parts per hundred. More precise measurements are not necessarily more accurate.